

Sub A

CLAIMS:

1. A cell transfer control method on an asynchronous transfer mode network, comprising the steps of:

5 when setting up a connection belonging to a particular traffic class which does not make bandwidth reservation, storing information indicative of a priority related to cell discard declared from a source unit in any of nodes in said network corresponding to
10 an identifier of said connection; and

when congestion occurs on the connection, instructing said node to perform selective discard processing on cells belonging to said particular traffic class in conformity to a predetermined discard
15 condition determined by a relationship between the status of said congestion and said priority.

2. A cell transfer control method according to claim 1, wherein:

said node is an ATM switching device
20 comprising a plurality of input ports and a plurality of output ports.

3. A cell transfer control method according to claim 1, wherein:

said node stepwisely changes a cell discard
25 priority class in accordance with the congestion status, and determines whether or not each cell belonging to said particular traffic class is discarded

in conformity to a predetermined discard condition determined by said priority and said cell discard priority class.

4. A cell transfer control method according to
5 claim 3, wherein:

said node is an ATM switching device comprising a plurality of input ports and a plurality of output ports.

5. A cell transfer control method according to
10 claim 3, wherein:

said node judges whether nor not a data block included in a data portion of each cell of said particular traffic class is divided from the same transmission message as a data portion of a previous cell, and performs the discard processing on cells falling under the discard condition in units of transmission message.

6. A cell transfer control method according to claim 5, wherein:

- 20 said node is an ATM switching device
comprising a plurality of input ports and a plurality
of output ports.

7. A cell transfer control method according to claim 5, wherein:

- 25 said node starts the discard processing on
cells which fall under a predetermined discard
condition determined by a relationship between said
congestion status and said priority, and continues the

discard processing on subsequent cells including part of the same transmission message as data portions of already discarded cells, even if the subsequent cells deviate from said discard condition due to a change in
5 said congestion status.

8. A cell transfer control method according to claim 7, wherein:

said node is an ATM switching device comprising a plurality of input ports and a plurality
10 of output ports.

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9. A cell transfer control method according to claim 5, wherein:

said node excludes cells including data blocks of the same transmission message as data
15 portions of previously sent cells from cells to be discarded, within cells falling under a predetermined discard condition determined from a relationship between said congestion status and said priority, and starts the discard processing from a cell including a
20 head data block of a subsequent new message.

10. A cell transfer control method according to claim 9, wherein:

said node is an ATM switching device comprising a plurality of input ports and a plurality
25 of output ports.

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11. A packet switching device connected to a plurality of input lines and to a plurality of output lines for transferring each fixed length packet

(hereinafter referred to as the "cell") inputted from each input line to any output line determined by cell header information, comprising:

- means, operative when setting up a connection
- 5 belonging to a particular traffic class which does not make bandwidth reservation, for storing information indicative of a priority related to cell discard declared from a calling unit as sub-class information corresponding to an identifier of said connection;
- 10 means for detecting a congestion status on each of said output lines; and
- means for selectively performing discard processing on a cell belonging to said particular traffic class in conformity to a predetermined discard
- 15 condition determined by a relationship between a congestion status on an output line, to which the cell is to be transferred, and said priority.
12. A packet switching device connected to a plurality of input lines and to a plurality of output lines for transferring each fixed length packet (hereinafter referred to as the "cell") inputted from each input line to any output line determined by cell header information, comprising:
- switch means having a plurality of input ports and a plurality of output ports for transferring a fixed length packet (hereinafter referred to as the "cell") inputted from each input port to any output port determined by cell header information;

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input line interfaces each connected between one of said input ports and an input line;

output line interfaces each connected between one of said output ports and an output line;

5 a call control unit connected to said switch means and each of said input line interfaces for transmitting and receiving a call control cell to and from said switch means and for transmitting control information including header rewrite information to
10 each of said input interfaces; and

congestion monitor means for detecting a congestion status of output cells on each of said output ports and notifying each of said input interfaces of a detected congestion status as
15 congestion status information,

wherein said call control unit includes means, operative when setting a connection belonging to a particular traffic class which does not make bandwidth reservation, for notifying an input interface
20 accommodating a calling unit, which is a requestor of the connection setup, of identification information on said connection and control information including traffic class information declared by a control message from said calling unit and sub-class information
25 indicative of a priority related to cell discard; and

each of said input interfaces includes cell discard control means for selectively discarding user

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cells belonging to said particular traffic class received from each input line after the connection is set up, in conformity to a predetermined discard condition determined by a congestion status at a 5 destination output port of said user cell revealed from said congestion status information and the priority related to cell discard notified from said call control unit.

13. A packet switching device according to claim 10 12, wherein:

15 said cell discard control means judges for each user cell belonging to said particular traffic class whether a data block included in a data portion of said cell is divided from the same transmission message as a data portion of a previous cell or divided from a new transmission message, and controls discard of user cells falling under said discard condition in units of transmission message.

14. A packet switching device according to claim 20 12, wherein:

25 said cell discard control means stores display information indicative of a cell under discard corresponding to a connection identifier of a user cell on which the discard processing has been started in conformity to said discard condition, and continues the discard processing in conformity to said display information for subsequent cells including a portion of

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the same transmission message as a data portion of an already discarded cell, even if the subsequent cells deviate from said discard condition due to a change in a congestion status.

- 5 15. A packet switching device according to claim 12, wherein:

said cell discard control means includes
means for excluding cells including data blocks of the
same transmission message as data portions of
10 previously sent cells from cells to be discarded,
within cells falling under said discard condition, and
for starting the discard processing from a subsequent
cell including a head data block of a new message.

16. A packet switching device according to claim
15 12, wherein:

said each input line interface includes
header conversion means for rewriting header
information of an input cell from each input line, and
input buffer means for temporarily accumulating head
20 converted cells; and

said cell discard control means selectively
accumulates input cells belonging to said particular
traffic class in said input buffer means in conformity
to said discard condition.

- 25 17. A packet switching device according to claim
16, wherein:

said cell discard control means judges for
each user cell belonging to said particular traffic

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class whether a data block included in a data portion of said cell is divided from the same transmission message as a data portion of a previous cell or divided from a new transmission message, and controls discard of user cells falling under said discard condition in units of transmission message.

18. A packet switching device according to claim 16, wherein:

said cell discard control means stores
10 display information indicative of a cell under discard corresponding to a connection identifier of a user cell on which the discard processing has been started in conformity to said discard condition, and continues the discard processing in conformity to said display
15 information for subsequent cells including a portion of the same transmission message as a data portion of an already discarded cell, even if the subsequent cells deviate from said discard condition due to a change in a congestion status.

20 19. A packet switching device according to claim 16, wherein:

said cell discard control means includes
means for excluding cells including data blocks of the same transmission message as data portions of
25 previously sent cells from cells to be discarded, within cells falling under said discard condition, and for starting the discard processing from a subsequent cell including a head data block of a new message.

20. A packet switching device according to claim 16, wherein:

said switching means includes output buffer means corresponding to said each output port, and means 5 for distributing each of user cells having a head converted by said each input line interface to either of the output buffer means specified by header information; and

said congestion monitor means detects a 10 congestion status of said output cell from an accumulation situation of user cells in said each output buffer means.

21. A packet switching device according to claim 20, wherein:

15 said cell discard control means judges for each user cell belonging to said particular traffic class whether a data block included in a data portion of said cell is divided from the same transmission message as a data portion of a previous cell or divided 20 from a new transmission message, and controls discard of user cells falling under said discard condition in units of transmission message.

22. A packet switching device according to claim 20, wherein:

25 said cell discard control means stores display information indicative of a cell under discard corresponding to a connection identifier of a user cell on which the discard processing has been started in

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conformity to said discard condition, and continues the
discard processing in conformity to said display
information for subsequent cells including a portion of
the same transmission message as a data portion of an

- 5 already discarded cell, even if the subsequent cells
deviate from said discard condition due to a change in
a congestion status.

23. A packet switching device according to claim
20, wherein:

- 10 said cell discard control means includes
means for excluding cells including data blocks of the
same transmission message as data portions of
previously sent cells from cells to be discarded,
within cells falling under said discard condition, and
15 for starting the discard processing from a subsequent
cell including a head data block of a new message.

24. A packet switching device according to claim
20, wherein:

- 20 said switch means includes a plurality of
output buffer means for each of said output ports, and
allocates one of said output buffer means to a cell of
a traffic class which guarantees a transfer rate.

25. A packet switching device according to claim
24, wherein:

- 25 said cell discard control means judges for
each user cell belonging to said particular traffic
class whether a data block included in a data portion
of said cell is divided from the same transmission

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message as a data portion of a previous cell or divided from a new transmission message, and controls discard of user cells falling under said discard condition in units of transmission message.

- 5 26. A packet switching device according to claim 24, wherein:

said cell discard control means stores display information indicative of a cell under discard corresponding to a connection identifier of a user cell
10 on which the discard processing has been started in conformity to said discard condition, and continues the discard processing in conformity to said display information for subsequent cells including a portion of the same transmission message as a data portion of an
15 already discarded cell, even if the subsequent cells deviate from said discard condition due to a change in a congestion status.

27. A packet switching device according to claim 24, wherein:

20 said cell discard control means includes means for excluding cells including data blocks of the same transmission message as data portions of previously sent cells from cells to be discarded, within cells falling under said discard condition, and
25 for starting the discard processing from a subsequent cell including a head data block of a new message.

28. A packet processing device for receiving call control information from a terminal unit when a

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connection is set up, said call control information including traffic class information and sub-class information indicative of a priority related to cell discard, comprising:

5 means for storing said traffic class information and said sub-class information for a connection of a particular traffic class which does not make bandwidth declaration upon initiating a call; and

cell discard control means operative when

10 congestion occurs on said connection to selectively discard user cells by specifying cells to be discarded based on a relationship between a degree of the congestion and a priority indicated by said sub-class,

wherein user cells are selectively discarded

15 in accordance with a connection to which each user cell belongs and a degree of congestion, even if the user cells belong to the same traffic class.

29. A packet processing device according to claim
28, wherein:

20 a header portion of each user cell includes a data block set in a data portion subsequent thereto, and delimiter information indicative of a relationship with a data unit treated by a higher rank protocol; and
said cell discard control means specifies

25 cells to be discarded in data units of said higher rank protocol based on the delimiter information of each user cell.

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